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# THE PSYCHOLOGICAL BULLETIN

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## INTELLIGENCE TESTS

BY RUDOLF PINTNER

*Teachers College, Columbia University*

*General Books.* Three books dealing wholly with intelligence testing have recently been published. Dearborn (32) covers the whole field very effectively, giving a good discussion on such topics as the meaning of intelligence, the rate of development, the average mental age of adults, sex differences and the like. Hull (65) is primarily concerned with illustrating the technique of test construction. The third book is in French by Decroly and Buyse (34) and it is intended as an introduction to this field for French-speaking countries. There are translations of English and American tests and also some new tests.

Ellis' (39) compact volume on individual differences contains a great deal about the results of intelligence testing as well as other kinds of testing. McCall and Bixler (90) show how intelligence tests may be used in school classification. Four books in the general field of educational measurement each give a brief but inadequate treatment of intelligence testing. These books are by Smith and Wright (114), Fenton and Worcester (42), Carroll (20), and Wilson and Hoke (121), a second edition of their previous work.

*Bibliographies.* Pintner (102) gives the usual yearly summary in this journal. Baldwin's (6) summary on Child Psychology contains many references on intelligence testing. An English publication by the Board of Education (11) gives a long bibliography, valuable for the references to European literature.

*The Meaning of Intelligence.* Kelley (73) studies "idiosyncrasies within homogeneous racial groups." He investigates the presence of group factors by means of the Spearman tetrad-difference technique. He finds such factors as, verbal, number, memory, spatial and

speed. The common factor or "g" is probably due to heterogeneity of race, sex, maturity, etc., and he believes that his work leads to a multiple-factor hypothesis rather than to a single-factor one. Claremont's (22) discussion is entirely theoretical and of little help to the mental tester. He arrives at such descriptions of intelligence as "the power to realize the necessity of certain reality inter-connections" and "the power to become aware of the necessity in the very nature of things of certain causal relationships." Variability or versatility of response is stressed by Edwards (38) as the most important aspect of intelligence. Mackie (86) argues that the sampling theory is not a variant of the two-factor theory, as Spearman maintains, but that it can be upheld as an independent theory. Garrett (48) gives memory, learning and intelligence tests to university students and finds a distinct relationship between these three types of tests. He uses the tetrad-difference technique to discover a small memory factor. This same technique is used by Brigham (14) to find the group factors common to subtests of the College Entrance Board Scholastic Aptitude Tests. He also continues his discussion from the last report upon the difficulty and validity of test items.

*The Relations of Intelligence.* Travis and Hunter (120) consider the relation between intelligence and reflex conduction rate. For small select groups of adults and university students they get correlations as high as .87 between intelligence test scores and the rate of the patellar reflex. These remarkable results, they believe, would form a neurophysiological basis for Spearman's "g," and this general rate of nervous conduction would be the common factor. Lemon (81) finds a positive but small correlation between reaction time and intelligence, thus differing from Travis and Hunter above, and also from Peak and Boring's work previously reported. Freeman (45) investigates power and speed in the Dearborn Group Test by giving the test with standard time limits and also with double time. The  $r$  is .88. Scores do not increase much, hence the test is mainly one of power. Ackerson and Estabrooks (1) find correlations between test scores and teachers' ratings of about .50 or .60. Keal (72) believes that the greatest reason for the variations in mental ratings from time to time is to be found in the physical condition of the subjects. The George Washington Social Intelligence Test is reported on by Broom (17) and by Hunt (66). The former finds a correlation of .40 and the latter correlations from .25 to .57 between the abstract intelligence and social intelligence of university students. Hunt also finds a reliability of about .88 for the test.



Adams (2) gives the correlations between intelligence scores and personality traits of college students. Intelligence correlates between .27 and .44 with ability to report, according to the work of McGeoch (92) with school children. Woodrow (123) finds that unevenness in mental ability increases with M.A. from age eight to fourteen, and with M.A. constant, unevenness increases as the I.Q. increases and also as the I.Q. diminishes.

*Growth and Constancy of Growth.* Gesell's (53) notable study of growth in infancy would seem to indicate that mental growth is probably as constant during the first two or three years of life as it proves to be later on. The repeated examinations of many children give many interesting growth curves, giving us for the first time a very good picture of the probable course of the growth curve from birth to three years. The effect of premature and postmature birth is discussed and the effect upon the developmental quotient noted. The importance of both hereditary and environmental factors are stressed, but conditioning cannot achieve everything. Rogers *et al.* (109) report retests of 60 cases on the Binet by student examiners and find correlations of .69 and .75. Kluever has translated a theoretical article by Stern (115) which discusses the constancy of the I.Q., but presents nothing new and gives no new data.

*Influences upon Intelligence Ratings.* Freeman (44) repeats Burt's famous (infamous!) work and reports the partials. He gets a correlation of +.31 as contrasted with Burt's -.07 between Burt Reasoning Test and School Work with Binet constant, hence he concludes that the Burt Test is not independent of school work and cannot be taken as a criterion of intelligence. Bobertag (12) gives Form A of a test, then reads over and explains the test; then gives Form B and finds an average increase of 54 per cent in score. But he finds no transfer from practice on one kind of test material to another different kind of such material. Chen (21) raises the question of the coachability of different types of test material and finds that the Analogies and Number Sequence tests of the Pintner Rapid Survey Intelligence Test are more coachable than the other subtests. On the Thorndike CAVD Tests, he finds arithmetic is the least coachable. De Weerd (35) reports the case of an undernourished boy with an I.Q. of 116; two and a half years later the I.Q. is 130 with improved physical condition. Fox (43) gives results from 182 glandular cases with an average I.Q. of 74, as compared with 78 for the total clinic group. In 22 cases retests from six months to a year

after treatment result in an average gain of 1.5 points in I.Q. The author finds no evidence of gain in I.Q. as a result of treatment.

*Testing Techniques.* Keys (74) shows that prediction increases by averaging test ratings for the past two years where several tests have been given. Thurstone (118) uses his method of absolute scaling to plot mean performances by age. He then extends the curve downwards and finds it coincides with birth, and concludes that "whatever is measured by the group intelligence tests, it begins its development at birth or shortly before." Thomson (117) discusses the regression line that should be used in the standardization of a test. Age on test is an artefact, due to the cutting off of the C. A. groups. Greene (59) proposes a summary sheet for the Stanford-Binet whereby the standing of an individual on different types of tests can be readily seen, so as to analyze his different strengths and weaknesses. Penning (99) proposes developmental quotients, both physical and mental. Bartsch (7) shows that the Binet rating of one child was not in accordance with his school work and his standing on other tests. He then criticizes the Binet Method of scoring and also particular tests in the series.

*Scales and Individual Tests.* Drever and Collins (37) present a new performance scale of eight tests with norms based on 200 hearing and 200 deaf subjects. Arthur (5) presents a new standardization of her performance scale. Hutt (67) gives a standardization of a color cube test based on 1,198 children. Murphy (95) gives the results for 500 children in grade V for several different tests in order to establish the ten-year-level of competency. Much work has been done with tests at the preschool level. Goodenough (57) presents an elaborate report of the Kuhlmann-Binet for 495 cases, ages eighteen to fifty-four months. Retests give a correlation of .82. Nursery school experience of six months shows no superior gain in I.Q. There is a distinct correlation between social status and I.Q. There are many other interesting results in this thorough study of Binet tests with the preschool child. Hallowell (60) gives norms at bimonthly intervals for several performance tests for children of ages one to four years. Goodenough (56) gives norms for the Wallin Peg Boards for ages two to four, finds the reliability to be between .58 and .79, and the correlation with the Binet to be about .50 for single age groups. Hetzer and Wolf (62) present an elaborate series of tests, ten at each month, for children from two to eleven months.

*Group Tests.* No new group intelligence tests in this country

have come to the writer's notice, in spite of the repeated platform declarations of oratorical psychologists that "tests are pouring from the press." In the foreign literature Decroly and Buyse (34) present some new group tests. Netschajeff (97) describes a battery of ten tests given to Russian children, ages four to eight. He finds no difference between various racial groups in Russia, but undernourished children do poorer than well-fed children. The tests are group tests derived from the Binet Scale, but no total score for the battery is calculated. Piéron (100) gives the standardization of a battery of six tests for ages eleven to fifteen. These tests are grouped into various categories and a subject's performance can be plotted on a psychological profile. McTaggart (87) describes information tests of a technical type for boys and for girls, and a new "house plan" test. These non-scholastic tests are designed for pupils who are backward in school work. Kuhlmann (77) compares the Kuhlmann-Anderson group tests with seven others. He gives an elaborate comparison, showing correlations and distributions, laying much weight on the discriminative capacity of the tests as one proceeds from age to age. He protests against exclusive reliance upon our present-day statistical definitions of reliability and validity. Dougherty (36) takes nine well-known primary tests and makes an elaborate comparative study, ranking them from various points of view. The volume edited by Bell and Suhrie (9) contains some results of group intelligence tests, with reference to retests (N.I.T. retests after  $1\frac{1}{2}$  years,  $r = .87$ ) and correlations between tests, *e.g.*, Pintner-Paterson and Binet,  $r = .67$ ; Binet and Stenquist,  $r$ 's from .04 to .33; Stenquist and N.I.T.,  $r = .25$ ; and so on. Fuller (46) gives correlations between the Minnesota Paper Formboard Test and other tests. Lincoln (85) finds a correlation of .85 (experienced examiners), and one of .72 (inexperienced examiners), between the Binet and Dearborn Intelligence Examination I.Q.s. McAnulty (89) finds a correlation of .63 between the Binet and N.I.T., one of .73 between the Binet and Terman group and one of .81 between the N.I.T. and Terman group.

*The Superior.* Only two references on superior children have been found. Jones (69) gives a description of a group with I.Q.s above 130, gives results on many of the Witmer tests, finds they have superior homes, and that the group contains many Jewish children. Goddard (54) gives a general description of the school training of gifted children in Cleveland. The I.Q.s range from 108 to 172 with

a median of 128, with only nine cases below 120. Of the 244 cases, 127 are boys and 117 girls.

*The School Child.* Three references describe the general use of tests in classification. Worlton (124) finds that the difference between heterogeneous and homogeneous grouping is not great, but in general the homogeneous classes do better. The achievement scores of bright pupils in homogeneous classes are higher than those in heterogeneous classes. Hollingshead (64) finds that classification according to E.A. is theoretically the best, but that any procedure would lack homogeneity in arithmetic and reading. All the groupings are hypothetical and the effect of teaching in homogeneous groups cannot be taken into account. Lämmermann (78) describes the method used in selecting children for promotion from the "Volks" to the "higher" schools in Germany. It is a combination of intelligence tests, educational tests and teachers' judgments. Gardner (47) gives further results of the testing of private schools in Philadelphia. The table of M.A.'s by grades shows the children from four to twenty-three months ahead of those in public schools. Nelson (96) gave educational and achievement tests to children at the end of the academic year, after the summer vacation, and just before Christmas. He found gains in intelligence during vacation, whereas there were minus or zero gains on the educational tests. Sims (113) shows a steady increase in I.Q. and socio-economic score by grade with a real difference in both ratings between the elementary and high school in the same community. Osgood and Beall (98) find the median I.Q. of 751 high school graduates to be 112, whereas the I.Q. for 2,344 entrants is between 93 and 99. Of the graduates only 7 per cent fall below an I.Q. of 95, whereas 35 per cent of the entrants fall below this point. Kaulfers (71) finds a median I.Q. of 108 (girls) and 109 (boys) for 1,002 junior and senior high school students of Spanish, yet 19 per cent of students of foreign language fail. He concludes that the courses are not adjusted to the abilities and interests of the students.

*The College Student.* Pierson and Nettels (101) give results for fifty cases, correlating intelligence ratings, college marks, high school marks and character ratings. They find a regression equation to predict college grades. Davidson and MacPhail (27) give the results of the Brown University Psychological Examination as applied to Brown University women students. Toll (119) reports the results of five years' testing of freshmen at Amherst with various tests and finds that no test picked out a lowest 4 or 5 per cent which would fail.



Garrison (50) gives the average scores on the Otis S-A Test for 331 students arranged according to their major field, with the highest mean for Psychology and Education down to the lowest for Public Health Nursing. Broom (16) finds a correlation of .23 between scores on the Thorndike Intelligence Examination and college marks in social science. Bear (8) shows the relationship between the intelligence scores for 172 freshmen and father's occupation, age of student and major field of study. Among 460 students tested by the Army Alpha, Miner (93) finds that only 20 per cent of those scoring below 110 points stay for the senior year. He also gives correlations between Alpha score and each semester's scholarship marks. Jones (70) gives intelligence and achievement tests to 112 freshmen and reports that personnel service given to those working below expectancy led to marked improvement in their work. Langlie (79) studies the Iowa Aptitude and Training Tests and finds that the aptitude tests do not add anything to the three training tests. He concludes that the training tests differentiate better than the aptitude and are, therefore, preferable for sectioning. Of thirty college cribbers tested by Brownell (18), 58 per cent are below the average of the college group in intelligence. The cribber tends to be a combination of extrovert, psychoneurotic and low intelligence. Two references deal with normal school students. Mosher (94) does not find the Thorndike Intelligence test good for predicting "teacher fitness," although there is a difference between the mean scores of successful and unsuccessful teachers. The correlation with marks in class is .18. Martens (88) finds the median score of 296 fourth year students in supervised teaching courses to be equal to the seventy-sixth percentile of college freshman on the Thurstone Psychological Examination.

*The Delinquent.* The I.Q. range is 57 to 117 and the median is 85 for 100 boys in a disciplinary school tested by McCaulley (91). The author finds 16 per cent feeble-minded and 26 per cent borderline. In a study of 435 clinic cases, Riddle (107) finds the mean I.Q. of those known to steal to be 78, of those who did not steal 70, of the undetermined cases 66. Increase in aggressive type of delinquency corresponds to increase in M.A. and I.Q. Adler (3) reports 31 per cent feeble-minded and 22 per cent borderline in a study of reformatory boys; only 4.6 per cent have I.Q.s above 110. Burgess *et al.* (19) in a study of the parole system in Illinois examined the intelligence ratings of adult prisoners in various institutions and



conclude that those of superior intelligence violate the parole as much as, if not more than, those of inferior intelligence.

*The Dependent.* One study of dependent children is made by Davis (29). Orphan children to the number of 1,051 are compared with 504 public school children. Seventy-two per cent of the former are below age mentally as compared to 45 per cent of the latter. Fifteen to 17 per cent of the orphans have I.Q.s below 70, and the mean I.Q. is 86 in contrast to a mean of 97 (Dearborn test) or 99 (Haggerty test) for the school children.

*The Deaf.* Drever and Collins (37), whose new performance scale has already been mentioned, report results on this scale for 200 deaf and 200 hearing children. They find no difference between the two groups. This is in sharp contrast to all previous comparisons of the intelligence of deaf and hearing children. Day (31), Fusfeld and Pintner's (103) survey of American schools for the deaf now appears in book form.

*Racial Comparisons.* Yoder (125) discusses recent results in racial comparisons and shows there is little agreement as to interpretation. Rigg (108) takes the results of thousands of group tests given in St. Louis. There is a difference of only two points between the native and foreign groups in I.Q. on the N.I.T. Of the foreign groups the Italians are lowest. There would seem to be a real difference in reading, but none in arithmetic for some foreign groups, and the author concludes that there is a language handicap in our usual verbal tests.

Klineberg (75, 76) reports the results of performance tests given to Indians and negroes. The white superiority over both groups is due solely to speed; indeed the Indians are said to be more accurate than the whites. Jamieson and Sandiford (68) report a thorough study of about 800 Indians on four different tests. They find a median I.Q. of 97 on the Pintner Non-Language, of 92 on the Pintner-Paterson Performance, of 80 on the N.I.T., and of 78 on the Pintner-Cunningham. The two first tests are non-language, and the last two are not. Monoglot Indians surpass bi-linguals on all tests except the Performance tests. The value of working with non-language tests with Indians is obvious from this study. Garth *et al.* (52) give the results of the Otis Classification Test for 1,000 Indian school children. They find an average I.Q. of 70. Indians are also tested by Blackwood (10) by means of the International Test and compared with Spanish-American children. For this test there are no American norms. The same author compares the two

groups with American norms on the Otis S. A. Test and finds, of course, that they fall below. Garth (51) gives results for a thousand Mexican children on the N.I.T. The median I.Q. is 78. The I.Q. increases from 72 to 87 from grade IV to grade VII.

One hundred six-year-old Italian children give a median Binet I.Q. of 96, according to Serota (112), but they come up to the norms on the Witmer formboards. Hirsch (63) presents an elaborate study of the Scotch-Irish stock in the East Kentucky mountains. The average I.Q. of 1,945 cases is 79. He finds no real tendency for the I.Q. to decrease with C.A. The correlation between I.Q. and C.A. is .005 for 796 cases. He concludes that "environmental factors are responsible for about 25 per cent, and hereditary factors for about 75 per cent of the sub-average mentality of our subjects."

In the foreign literature we have two reports. Davies and Hughes (28) in Great Britain report the results of group tests given to 1,894 Jewish and non-Jewish children attending three schools having about equal numbers of both in each school. The Jews excel the non-Jews by 10.5 points I.Q., by 13.0 points E.Q. in English and 10.6 points E.Q. in arithmetic. In Belgium, Decroly (33) gives the results for 7,160 cases, about half Walloon and half Flemish, tested on a translation of the Ballard test. The Walloons exceed the Flemish at almost all ages.

*Sex Differences.* Lincoln (84) devotes a whole book to this question going over all the available data for all types of tests. With reference to intelligence tests there appears to be no real difference, although there are slight differences on some subtests. Good-enough (55) goes over the literature and concludes that girls are superior linguistically and boys excel in arithmetic and general information. The author then presents results for 300 preschool children, ages eighteen to fifty-four months. The girls excel in verbal tests even at this early age and the boys excel on formboard tests. Commins (24) finds that girls are consistently better than boys on the McCall Multimental Test in comparing about 100 of each sex per age for ages nine to fourteen. Book and Meadows (13) analyze the sex differences among about 600 high school seniors. In general the boys are superior and this is attributed to selection. The boys excel in arithmetic and practical information; the girls in logical memory and language. Davis (30) finds no significant difference in intelligence between boys and girls in his large orphan group. His control group of public school children shows a slight superiority of the girls. Lentz (82) finds that girls get better school marks than

boys with Stanford Achievement Test scores constant. Lewerenz (83) finds that boys exceed girls on seven out of nine art ability tests.

*Inheritance.* Terman *et al.* (116) discuss the general findings of the 1928 Yearbook of the National Society for the Study of Education which was devoted to the problem of nature and nurture. An elaborate family history of the "Win" tribe is presented by Estabrook and McDougale (40) who assume that the original normal intelligence of the white stock was lowered by the mixture of negro and Indian blood. Few results of intelligence tests are given in the study. Wingfield and Sandiford (122) find a correlation of .90 for 45 pairs of identical twins, and one of .70 for 57 pairs of fraternal twins. Comparison of older and younger pairs shows them alike in resemblance in I.Q., E.Q., A.Q., etc. Orphans who spent 25 per cent of their lives in the same orphanage show no correlation when paired at random. Popenoe (104) shows that of the fathers of 485 sterilized children in a feeble-minded colony, only 1 per cent belong to the professional classes, as contrasted with 4 per cent in California and 31 per cent among Terman's gifted group. Otherwise the occupational distribution is much the same as in California, and the correlation between I.Q. of child and Barr rating of father is .02. Goodenough (58) gives the occupational distribution of the fathers of 380 preschool children, ages 15 to 54 months. The I.Q.s decrease as usual from the professional to the unskilled groups. Intellectual differences between social classes are well established by ages two, three, and four. Collins (23) shows the occupational distribution for the fathers of 4,727 school children, grades I to VI. The ranking of occupations agrees closely with those of previous reports.

*Miscellaneous.* Richards (106) gives the Otis General Intelligence Examination with time limits of 15 and 30 minutes and finds a correlation of .84 and argues that we may save time by using the shorter time limit. Cox (25) believes that some maze problems on the two-story maze make good intelligence tests from a study of the Thorndike scores and the maze scores of university students. Sasenhagen (110) compares rural and urban children in Germany on a battery of twelve tests. The rural children stand lower, but the author argues for qualitative differences. Cummings (26) compares 500 deserters with 2,000 recruits in the navy tested by means of the O'Rourke General Classification Test. The deserters score lower. There are  $2\frac{1}{2}$  times as many deserters as recruits in the lowest intelligence grouping. Brooks (15) studies the relationship between physi-

cal and mental traits during adolescence and finds that there is a slight indication that early physiological maturity goes along with high mentality. Estabrooks (41) finds the correlation between the intelligence of school children and gross cranial capacity to be positive but low, whereas there is no correlation between intelligence and relative cranial capacity. Garrett and Kellogg (49) find very small correlations between intelligence scores and the morphological indices of 221 university students. Social intelligence and abstract intelligence correlate .42. Schultz (111) finds no correlation between intelligence and machine ability measured by the Viteles' Machine Feeding Test in the case of 294 children. Pressey (105) concludes that it is not worth while to try to train college students who fall below the twenty-fifth percentile in intelligence. Those above this point are almost certain to be "saved" from failure by special training in methods of study. Lehman and Witty (80) compare the play behavior of children of low and high I.Q.s. The high I.Q.s are less social, have a livelier sense of humor, indulge in more activities requiring reading, and fewer activities of a motor type. Hartshorne and May (61) in their monumental work on Deceit show that low I.Q. is one of the concomitants of deceit. Intelligence and deception correlate negatively from  $-.50$  to  $-.60$ . Anderson (4) describes the Minnesota Mechanical Ability Tests.

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## EDUCATIONAL TESTS

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I. *General.* Three general textbooks dealing with educational measurements have appeared during the past year. Smith and Wright (95) have presented a careful treatment of various educational tests in light of important objectives in the subjects measured. The emphasis in the book is placed upon the outcomes which the test purports to measure rather than upon mathematical reliability. Selected tests for various subjects in the elementary and secondary school are described. Fenton and Worcester (27) have written a small book in which certain of the more elementary facts of measurement are given in a simple and very readable form. A revised edition of the textbook by Wilson and Hoke (116) has appeared. Many important changes and additions have been made. A comparison of the original edition, copyrighted in 1920, with the 1928 revision affords an interesting study in the developments in educational measurements during the past eight years.

In addition to the general textbooks mentioned above, attention should be called to a workbook in educational measurements by Greene (34). The book presents forty-five problems which would ordinarily be encountered in measurement. Suggestions are given in connection with the methods of solving such problem, and in most cases practice in actual computation is provided for. Mention should also be made of the brief discussion of achievement tests in the book by Levine and Marks (57) on the general problems of testing among normal and abnormal subjects.

Toops (109) looks over the general field of measurement and notes twenty-four changes which he thinks will take place in connection with the development of measuring instruments. Thorndike (106) says that tests will be made more accurate, will be arranged in a more convenient form for giving and scoring, and will be made more comprehensive in the measuring of desirable outcomes.

<sup>1</sup> The writer is indebted to Miss Dorothea Johannsen, a graduate student at Clark University, for assistance in the preparation of this review. The detailed analysis of most of the articles was made by her.



In commenting on accuracy of measurement he emphasizes the need for equality of units and true zero points in the scaling of tests.

It is obvious that development in educational tests cannot be divorced from the development in the practical application of test results. It is not always so obvious that the "no-man's land" between the field of scientific test construction and the field of practical uses of such instruments in school supervision and administration is a fruitful area for ingenious work. A very important contribution has been made in this field by Mort (65) in a book entitled "The Individual Pupil in the Management of Class and School." The book is written for school supervisors and administrators and deals with other matters in addition to educational measurement; however, the importance attached to the proper use of test results is indicated by the following quotation: "A program of testing that will make information available not only for the measurement of results in teaching subjects, or the improvement of the teaching of subjects, but will also provide objective information on abilities and achievements of individual boys and girls, is essential to an adequate adjustment of the schools to the needs of boys and girls. . . . Without such information the adjustments of schools to the needs of individuals is guesswork."

II. *Extension of Educational Measurement.* During the year there has been a large increase in the number and variety of tests. In the field of general achievement tests we may mention Orleans' (70) battery of ten tests for use in the elementary school. The battery was used in the so-called Fifth Annual Nation-Wide Testing Survey. Final facts with regard to norms, reliability, and validity are not available, since the results of the survey have not yet been fully analyzed.

Two reading tests have appeared. Sangren and Woody (86) have made a revision of their silent reading test which appeared in 1927. Several different aspects of reading are tested. The validity of the test, as measured by correlating it against the average of seven other reading tests, is .897.<sup>2</sup> Reliability coefficients of .94 and above were obtained. DeVault (20) presents a primary reading test for the first two grades. Two tests in geography, one in the geography

<sup>2</sup> It is impossible, of course, to interpret accurately coefficients of correlation without knowledge of the spread in age or grade upon which the coefficients were based. However, the limited space does not permit the including of such facts. The coefficients are presented for the purpose of conveying a general idea of the reliabilities of the tests.

of the world and the other in the geography of the United States are offered by Witham (119,118). The former is intended for elementary and high schools. The test for the United States is suitable for grades V and VIII. The reliabilities of both tests are the same, namely, .84. Each test comes in two forms.

In the field of history three new tests have been published. Stormzand (96) has devised a test in American history which is intended primarily as a guide to study. An answer book is available along with the test. Sloyer (93) has devised a test in world history. Denny and Nelson (19) have produced an American history test in two forms. The reliabilities reported range between .91 and .93.

A test in practical civics has been devised by Hill and Wilson (39). Specific situations are presented in the test and several lines of action are suggested as possible solutions. The testee is asked to indicate the most appropriate response. Norms are given for grades VI to XII. Burton and Burton (12) present a test which purports to measure knowledge of the facts in "political," "economic," and "social" civics; no attempt is made to measure any outcomes other than knowledge. Differential grade norms for racial and economic groups are given for grades V to IX.

There has been an especially great productiveness in the field of high school tests. Under the direction of Wood an important series of standard tests appears under the title of American Council Tests (1). The series includes tests in solid geometry, trigonometry, history, government, and economics. In each subject the test was constructed by the joint efforts of a subject-matter specialist and a specialist in test construction. The tests will be serviceable in college or high school classes.

Two Latin tests have been published during the year. Hutchinson (44) has devised a Latin grammar test which yields a reliability coefficient of .85. Two forms are available. Thompson and Orleans (105) have produced a rather comprehensive test called the New York Latin Achievement Test. It is recommended for use in diagnosis.

An English vocabulary test for high school and college students has been prepared by Markham (62). Median scores are given for grades IX to XII; no norms are available for college students. The reliability is .88. Pooley (75) has made a test to measure ability in English composition. The correlation found between pupils' test scores and teachers' marks on composition ability was .54. The reliability of the test is reported as .83. Ullman and Clark (111)

offer a test of classical references and allusions which is designed for use with classes in English, history, or classical languages. Poley (74) uses a multiple-choice type of test in an attempt to measure pupils' abilities to make a correct summary of a paragraph read. Simmons and Bixler (92) have devised a spelling scale. Norms have been provided for grades VII, VIII, IX, and XII. The scale is so arranged that teachers may construct their own spelling tests from the words presented.

A general science test consisting of two forms has been carefully devised and standardized by Powers (76). Another noteworthy test in the same subject has been constructed by Dvorak (21). Pieper and Beauchamp (72) have constructed tests to accompany a certain textbook in science.

In the field of mathematics attention should be called to two geometry tests. McMinder (60) describes a plane geometry test. The test has been submitted to some statistical analysis, and a reliability coefficient of .77 is reported. McCoy (59) has devised a test of three parts for use in solid geometry. Part 1 deals with lines and planes, and their relations; part 2 deals with memory for important solids; and part 3 deals with mensuration formulæ.

Nash (67) has devised a second form of the woodworking test bearing his name.

Symonds (103) has attempted to measure studiousness and to determine its effect on school achievement. Studiousness was measured by a questionnaire. He found that the multiple correlation coefficient between school marks and a composite, made up of scores on the Terman Group Test and scores on the studiousness questionnaire, was .415, which is .075 higher than the correlation obtained by using the Terman test alone.

In reviewing the extension of educational measurement by the addition of new tests in old fields and the devising of tests in new fields, we have called attention to extensions in various subjects in elementary school, secondary school, and college. But there has been a further extension. Tests have been prepared to measure teachers and prospective teachers. Waples and several collaborators (113) have devised tests to measure the knowledge of teachers as to the best methods of meeting typical problems which arise in the conducting of classes in various subjects. Six tests are available: one for problems arising in connection with general classroom procedure and management, one for problems connected with teaching English literature, and one each for problems arising in connection with

teaching natural science, mathematics, history, and English composition. Great care was exercised in constructing each test. Odell and Herriott (69) have constructed a test to measure the knowledge of teachers and prospective teachers on the principles of teaching in secondary schools. Jensen (47) describes a new test for the measuring of abilities in three aspects of educational work: teaching, educational research, and educational administration.

III. *Intensive Study of Current Instruments and Methods.* Amid the mounting quantity production in educational tests there is much material which stands high in quality. But many tests of past years which are perhaps good are falling into oblivion for lack of facts to prove that they are good. Many of the tests of the present year will fail to make much impression because evidence to prove their excellencies, if they have any, is so meager. Many well-trained workers, seeing the waste in overproduction and underanalysis of new tests on the market, are not constructing new tests; they are studying some of the most promising of the available ones. They are studying them with a view to determine their values and limitations. They are studying the methods of making test results more meaningful and useful.

Symonds (101) has made an important practical contribution in deriving comparable standards for nine popular high school tests. The scores on each of these tests were converted into scores on the Terman Group Test of Mental Ability by means of the line of relation procedure. Thus the standing of a pupil in one of these tests is made comparable with his standing in any of the others by this method of reducing all scores to a common scale. It is also made possible to compare each achievement test score of a pupil with his mental ability score as determined by the Terman Group Test. The ability standards are given in a table and detailed guidance in the use of the standards is given. The standards can readily be used by those who do not understand or who are not interested in the method of derivation.

Hull (42) considers the danger of drawing from correlations based on tests, conclusions concerning the factors measured. He says that the results usually obtained by partial correlation have no significance whatsoever in revealing hidden determining factors. Thorndike (28) emphasizes the fact that too much dependence should not be placed on the results of brief testing. Henmon (37) expresses appreciation of the benefits to education and psychology that have accrued from measurement, but he criticizes the inconclusiveness of

many experimental results. He says: "Our measurements are too imperfect to base a true science of education or a methodology upon . . ." Foran (29) fears that norms and standards are being used uncritically. English (26) thinks that grave errors are made at times in connection with tests due to a failure to give sufficient attention to errors of inadequate sampling and to a failure to give proper regard to variability. LaBrant (52) writes on the uses of standardized tests.

Symonds (102) lists and briefly discusses twenty-five factors which he thinks influence test reliability. Mangold (61) reports the most widely used formulæ for determining reliability, and gives a brief explanation of each. Edgerton and Toops (22) present a table by which one can determine the degree to which a test must be lengthened in order to have a desired reliability and validity. The table makes it possible to determine without computation the increased reliability and validity of a test when lengthened by any amount up to fifteen times its original length. They submit the following rule: "If the addition of one minute of test time will not add .005 to the reliability coefficient or .002 to the validity coefficient, then it is not worthwhile to increase the length of the present test further, and one should search then instead for different test content." They feel that in making the decision as to whether a test should be lengthened or a new test constructed, the facts of validity are more important than those of reliability. "The more pertinent consideration," they say, "is always validity rather than reliability, for no test, however reliable, if used by itself is of any worth unless its validity is acceptable."

Thurstone (108) further develops his absolute scaling method. Finding that variability in scores is not the same from grade to grade or age to age he develops a scaling method which will take these differences in variability into account. He proposes a technique, based upon an extension of his scales downward, for determining zero points. His technique for determining zero points is elaborated further in another article (107). Ellis (23) studies the problem of measuring separately ability and speed in a task. Bliss (6) argues that there is little ground for the belief that the responses on a test item can be given credit in proportion to the frequencies with which they occur. Pratt (77) feels that too much attention is paid to the mechanics of measurement and not enough to educational philosophy. He predicts a decrease in the testing of formal learning and an



increase in the testing of attitudes, appreciations, and ideals, but he offers no suggestions as to methods of measurement in this field.

The accomplishment quotient technique continues to be a live topic for study and discussion. Freeman (31) reports a study made on seventy-seven nine-year-old children who were given the Stanford Revision of the Binet-Simon Intelligence Test and a number of achievement tests. From an analysis of his data he concludes that the Stanford-Binet Test is not measuring to a large extent the same thing as achievement tests and that the A.Q. may be retained as a rough measure of the degree to which a group is working up to capacity. Nygaard (68) proposes a formula for finding A.Q. which eliminates the negative correlation between A.Q. and I.Q. and corrects for differences in the variabilities of E.A. and M.A. Wilson (117) emphasizes the necessity of keeping two points in mind in interpreting A.Q.'s: first, the reliability of the tests upon which the quotients depend, and second, the fact that the thing measured by an intelligence test and represented by M.A. in the formula for A.Q., is not the sole determiner of educational achievement.

Let us turn now to the articles dealing with facts and judgments concerning specific tests in the various subjects. Several articles deal with reading tests. Sangren (85) emphasizes the fact that silent reading is not a single process measurable by one test. He calls attention to the work which is being done by Woody and Sangren in connection with their test which purports to measure many aspects of reading ability. Mosher (66) reports the results of an experiment on six standardized reading tests. He finds that the errors of measurement on certain tests are nearly twice as great as the errors on others. The reading test of the Stanford Achievement Test stands first, with a reliability coefficient of .92; the Monroe test stands second, with a reliability of .88; and Haggerty third, with a reliability of .87. Rock (83) makes an analysis of the requirements of a reading test for use in grades I and II and judges eleven standard tests in light of these requirements. He regards the Gates Primary Reading Test as the best of the reading tests for these grades. The reading tests in the Standard Achievement battery and the Detroit Word Recognition Test are considered as quite satisfactory. Foran (30) thinks the best reading tests in the elementary grades for the measurement of rate are the Monroe, the Gates, and the Burgess tests. None of the existing tests are considered entirely satisfactory for the measurement of comprehension in reading, but

the reading tests of the Standard Achievement Test and the Lippincott-Chapman battery were rated as best. Irmina (46) reviews the most important vocabulary tests.

Arithmetic reasoning tests are evaluated by Immaculata (45) in light of certain requirements which she formulates. She ranks the four best tests in the following order of merit: Buckingham, Stanford, Otis, and Monroe.

Uhrbrock (110) studies the degree to which the estimates of geography ability made by teachers and pupils agree with standardized test results. The total test results were based on seven geography tests. Estimates of teachers showed a correlation of .35 with this battery; estimates by the pupils of the geography ability of their classmates correlated .32 with the test.

The Stanford Achievement Test has been studied by Baldwin (5). Seven hundred and eighty-two children were measured by the test for three consecutive years and a high degree of constancy in the scores was found from year to year. Seventy per cent of the "total" scores predicted for 1925 from the 1923 results did not deviate more than  $\pm 5.0$  points from the scores actually obtained.

Smith (94) evaluates four high school chemistry tests on the basis of data gathered by administering the tests to a few high school classes. The intercorrelations found by correlating the tests among themselves ranged from .33 to .62. Each test was correlated against the battery of tests. The experimenter concludes that the Gerry test is best for covering college entrance requirements, that the Rauth-Foran test is probably best for diagnostic purposes, and that the Rich test is superior to the others in measuring the pupils' thinking abilities. These interpretations are obviously based on other observations in addition to the plain statistical findings, but the facts upon which these observations depend are not reported in the article.

Cheydleur (14) describes the construction and validation of a French grammar test of the multiple-choice variety. The reliability of the test is reported as .93; the coefficient of correlation between the test and teachers' grades is .55, and the correlations between the test and other standardized French tests range from .60 to .89. Cheydleur finds that the differences between the averages of different schools are very large and urges the use of standard tests to improve this situation. Differences in scores between groups taught by the direct method and those taught by "other methods" were found to be in favor of the latter, though too many variables were left uncontrolled to justify a definite conclusion. Groups which had studied

Latin were found in every case to be equal or superior to the non-Latin groups, but again many variables were uncontrolled.

Kwalwasser (50) reviews all the important measurements in the field of music. Three articles dealing with the Seashore tests of musical ability have appeared. Larson (54) finds that the Seashore Consonance Test yields quite reliable results if all instructions are followed very carefully, but he feels that slight variations in the instructions at points will invalidate results. Brown (10) finds the validity for the individual Seashore tests to be low, but reports it to be fairly high for the test as a whole. Heinlein (36) criticizes the Tonal Memory Test on theoretical grounds. Wright (121) discusses the relation between capacity and achievement in music. She recommends that the Seashore test be applied in all controversial cases regardless of age as a reliable check on personal judgment. Seashore (90) reviews the progress of the testing movement in music and indicates the advances made in the study of both musical appreciation and musical performance.

Brooks (9) has studied the value of drawing scales in improving teachers' ratings of drawings. He finds the use of a drawing scale reduces the inaccuracy of unaided judgment by about one-half. The coefficient of variation with the Thorndike scale is about 70 per cent as great as with the Kline-Carey scale. The judges had had experience with handwriting and composition scales—a fact which probably had something to do with the immediate success of the scale in decreasing the spread in judgments.

IV. *Use of Tests in Surveys.* One of the important uses made of achievement tests from their inception has been their employment for inventory purposes. Often criticism has been aimed at the survey idea in measurement. The main criticisms have been that the results of many surveys have been of little or no value for the discovery of new scientific principles, and that on the practical side no use was made of the results. The criticisms, then, are aimed not at the use of tests in surveys but rather of the manner in which the results of such measurements are used (or not used!). If we compare the sections on tests in recent surveys with similar sections in such older surveys as those of Gary, Indiana, and Cleveland, Ohio, we find large differences. There is less emphasis in recent surveys on the comparison of pupils of a city with national norms as a matter important in itself; there is more emphasis on the interpretation of the results of tests in a form which will tend to lead to remedial procedures, and to the individualization of instruction.

We may mention the survey of deaf schools conducted by Day, Fusfeld and Pintner (18) and (73) as an illustration of a study of theoretical and practical interest in which more is done than merely compare pupil performance with norms. An achievement test battery and a non-language intelligence test were given to 4,432 deaf children. These children made poorer scores on both the educational and intelligence tests than the hearing children, and they did poorer on the educational tests relatively than on the intelligence tests. But besides these facts—which represent comparison with norms and which perhaps are valued more by the scientist than by the practical educator—Pintner finds by an analysis of his data an important fact about the results achieved by use of different methods of teaching. He finds no significant differences between groups trained by the "oral," the "manual," or the "combined" methods—a fact which calls into question the extravagant claims made by some of the advocates of these different methods.

As an illustration of the attitude expressed by educational survey staffs concerning the value of analyzed measures of achievement, we may quote from the Newburgh Survey, Strayer, Director (99): "The ultimate measure of the schools of Newburgh must be found in the achievement of individual boys and girls when their grades, ages, and mental capacities have been taken into account. An effort has been made to determine this degree of success through the use of standardized mental and educational tests."

Seven surveys in which attempts have been made to evaluate instruction have been published since the 1927 review. In all of these extensive use has been made of standardized tests. In the Newburgh survey batteries were given to samplings of pupils in grades IV to VIII inclusive and to a sampling of all twelve-year-old children. Pupils were compared with the norms in both age and grade. Tests were given in high school and, by means of the Symonds Ability Standards, comparisons were made between educational achievement and intellectual ability. In the Closter Survey (98) extensive testing was done in the elementary and high schools. The importance of the use of tests for diagnosis was especially stressed. An analysis was made of certain types of errors in arithmetic and composition. In the Havelock, Neb., Survey (38) standardized tests were used extensively, and special emphasis was placed on the lack of homogeneity found in the classes tested. Standardized tests in the fundamental subjects in elementary and high schools were used in the survey of Aurora, Minnesota, Engelhardt, Director (24). Sugges-



tions were made, based on analyses of the test results, looking to improvement of instruction. Much the same program was carried out by the same worker in New Prague, Minnesota (25). Sears (89) conducted a survey of the schools of Napa, California, and included a rather extensive testing program in grades II to VIII. A survey of the elementary and junior high schools of Schenectady, New York, was made by Wiley (115), and important recommendations concerning pupil classification were made on the basis of test results.

The degree to which tests are being used by bureaus of educational research in the various localities for survey and other purposes is indicated in an article by Chapman (13). By means of a questionnaire which he sent out he found the following ten functions of such bureaus mentioned most often: achievement testing (mentioned by 100 per cent); mental testing (93 per cent); classification (86 per cent); experimental study of curriculum problems (81 per cent); surveys (76 per cent); investigations and objective experiments other than surveys (74 per cent); devising record and report forms (74 per cent); training teachers for testing (66 per cent); test construction (60 per cent); organization and supervision of special classes (58 per cent).

*V. Use of Tests in Improving Marks and Marking Systems.* During the year one book and a large number of papers have appeared which are primarily concerned with the new-type informal examination. Orleans and Sealy (71) have written a book which embodies the results of a project of introducing newer methods of testing to a large group of supervisors and teachers in the rural and town schools of a section of New York State. Specific guidance in the construction of the different types of tests is given and an extremely liberal supply of examples is included. Hull (42) considers in some detail the construction and use of the newer types of examinations. Both Lee (55) and Worcester (120) analyze the types of errors most frequently made in constructing them. Swope (100) points out the advantages of the new type test in industrial subjects and shows specifically how they may be employed. Hunter (43) discusses the uses of such tests in shop courses.

Ruch and Charles (84) report a study which has been carried on for several years in connection with determining the relative reliabilities of the various kinds of new type examinations in beginning psychology courses. The results on the completion type were used as the criterion against which the results on the true-false and on three different types of the multiple-choice examinations were



correlated. When allowances were made for the number of questions of each type which can be answered in a given amount of time, there were no important differences found between the types considered. Reeve (81) discusses the advantages and disadvantages of the essay type and new type examinations in mathematics. Martin (63) presents the results of an investigation in which the true-false, the five-response multiple choice, and the completion types of questions were compared. On the basis of his results in validity and reliability the author ranks the types in a descending order of merit as follows: completion, multiple-choice, true-false. Differences in testing time were not considered. Shulson and Crawford (91) report a study on the true-false and completion types of tests to determine their relative validities. They find the two types about equal in validity on the limited criterion used. Curtis and Woods (16) report the results of an investigation of a modified form of the multiple-choice test. The modification consisted in offering five choices and, in addition, a blank in which the correct response was to be inserted in case no one of the responses offered was correct. The authors conclude that the modified form is as valid and reliable as the usual form and they claim that it has certain diagnostic features which the ordinary recognition form does not have. Krey (49) gives the advantages of various kinds of new type tests suitable for measurement in history. Among other suggestions, he recommends the correcting of each false statement instead of merely marking each statement as true or false. Greene (33) has made an interesting study of a new method of constructing a true-false test. Each item of information covered by the test was presented twice; at one place the item was given in a false form, and at another in a true form. The paired method proved to be quite satisfactory, but for a given amount of time it is not certain that it is superior to the ordinary form for regular testing purposes. Lehman (56) studies the degree to which students profit by changing their first responses on true-false tests. Of those who made changes in their marks, due to second thought, approximately one-half profited and one-half did not. In general, changes made by superior students tended to raise their scores while those made by the poorer students tended to lower theirs. Weidemann (114) lists several limitations of the true-false type of question. The more important ones mentioned are: (1) the difficulty of testing items of information where small or subtle differences are to be noted, or where qualifications are necessary to avoid ambiguity; and, (2) the difficulty of testing more fundamental

knowledge than the mere knowledge of rightness or wrongness of an answer. Suggestions are given as to ways of meeting these limitations. Roberts and Ruch (82) find that the false statements in true-false tests tend, to some extent, to be fixed in memory, but only for brief intervals; the true statements also tend to be fixed. The net effect of such tests appears to be slightly positive. At any rate the evidence does not indicate that true-false tests can be condemned as influential in decreasing the knowledge of the examinee.

Three articles have been written on the problem of improving the marks or ratings assigned to teachers. Brandenburg and Remmers (7) present a rating scale for class-room efficiency. The method is unique in that the rating is made on the basis of reactions of students toward the teachers. The authors claim that the teacher who obtains and studies these reactions of their students will gain much information which may enable him to increase his popularity. Baker (4) reports a scale to be used in training schools in rating the abilities of prospective teachers. Schneidemann (87) feels that some method can be devised which will be better for judging teaching ability than subjective rating scales, and he emphasizes the importance of research along this line.

VI. *Use of Tests in Pupil Classification.* McCall and Bixler (58) have written a little book entitled "How to Classify Pupils" as the first volume in the new series of Standard Procedures in Education. This book deals with the use of standard tests to improve the classification and sectioning of pupils. In each of the seven chapters a practical problem is raised and the solution is given in the form of the various steps required. Very little theoretical discussion is given. Hollingshead (40) has studied the relative effectiveness of a number of different measures in classifying and sectioning school children. He tried mental age, educational age, intelligence quotient, educational quotient, and a composite based on E.Q. and I.Q., and finds educational age to be most satisfactory for both grading and sectioning. Interesting figures are given which show that when homogeneous groupings are based on the results of a general intelligence or general achievement test, large variabilities still occur in the separate subjects.

VII. *Use of Tests in Diagnosis and Remedial Teaching.* Special emphasis is placed upon diagnostic testing in the revised textbook by Wilson and Hoke (116) which has already been mentioned. LaBrant (51) has prepared an outline of the steps required in making full use of diagnostic tests in English. Ginsberg and Inglis (32) have published a test in English essentials for grades

VIII, IX, and X. Suggestions are offered as to methods of applying remedial work on the basis of the test results. Pribble and McCrory (80) have prepared a diagnostic test in English grammar for use in high schools and colleges.

Pressey (78) has devised three tests for use in diagnosis of reading difficulties which depend upon faulty eye movements. These are individual tests. They measure fixation pauses, regressive movements, and return sweeps. Suggestions on the measurement of vocalization and ability in word analysis are also given. Dansforth (17) presents a series of silent reading tests which are intended as exercises to be used daily. The tests are bound in pads and are convenient for use as practice material. Pressey and Pressey (79) present a chart for the measurement of legibility of handwriting for use in grade III and above. Suggestions are given on the methods of diagnosing individual difficulties.

Schorling, Clark, and Potter (88) present a series of arithmetic tests for the study of individual progress. The exercises are likely to prove valuable for remedial instruction. The same authors have also devised a survey test which may be used for diagnosis, though it is intended primarily for the general measurement of achievement. A test which is intended to measure number concepts and arithmetic vocabulary has been devised by Armstrong (3). The use of the test in diagnosis is discussed.

Wait (112) reports the facts concerning a series of solid geometry tests, devised by Morgan, Wait, and Dvorak (64). These are recommended for diagnostic use. The series is composed of nine brief tests, which are designed for use as semi-monthly quizzes, besides a preliminary and final test. The correlation found between scores on the test series and teachers' final grades was .74. Kilzer and Kirby (48) have constructed a test for the mathematics needed in high school physics. The test is based on an analysis of the problems in five physics textbooks.

Cheydeur (15) in discussing the results and significance of the new type modern language tests points out the contribution made by such results in emphasizing (1) the need for more careful grading and sectioning, and (2) the need for remedial treatment of individual difficulties.

VIII. *Use of Tests in Prognosis and Guidance.* Hull (42) has written an important book on the general problems of aptitude testing. He has selected from the very extensive and rapidly increasing literature in this field the most important facts, and from these

he has crystallized out general principles wherever possible. This occupies the first half of the book. The last half deals with the methods of aptitude testing and the techniques of test construction.

Anderson (2) reports three tests, or rather sub-tests, which appear to be highly reliable in predicting success in mechanical shop courses. Stoy (97) describes several new sub-tests for predicting success in mechanical drawing. Hubbard (41) studies the validity of measures of mechanical interests as a means of predicting success in mechanical pursuits. Facts on mechanical interests were gathered by questionnaires. Interest scores, as thus determined, correlate poorly with objective measures of mechanical ability. The investigator suggests, however, that the interest scores may have value in vocational guidance when used in conjunction with scores from ability tests.

Telford (104) discusses his experimentation in measuring stenographic ability. Five aspects of stenographic performance were investigated.

Hammond and Stoddard (35) have made a study of the usefulness of the Iowa Placement Examinations in predicting success in college. The achievement or learning tests and the "aptitude" tests were studied separately. The scores on the achievement tests were more efficient than the scores on the "aptitude" tests in predicting success in liberal arts colleges. The correlation between the two types of tests was found to vary from  $+.54$  to  $+.58$ . A comparison was made of the achievement test scores of students coming from different secondary schools, and tremendous differences were found. Langlie (53) also investigated the relative values of the two types of tests in the Iowa Examination in predicting grades which students will receive in college. His findings are in agreement with those of Hammond and Stoddard.

To indicate how prognostic measurements have been extended to new fields, we may mention the tests published by the Bureau of Public Personnel Administration Staff (11). The series consists of partially standardized tests for abilities in 17 types of work, including the work of food inspector, policewoman, laboratory assistant, stenographer, blacksmith, junior clerk, baker, etc.

The 1928 Scholastic Aptitude Tests which were used by the College Entrance Examination Board are described by Brigham (8). The 1928 edition differs from the editions of 1926 and 1927 in that all numerical tests, that is, the test in arithmetic problems and the one in number-series completion, have been excluded on the basis of



statistical studies of results of preceding years. The sub-tests employed are synonyms, easy paragraph reading, hard paragraph reading, classification, antonyms, analogies, and double definitions. The committee charged with the construction of these tests feels that numerical tests should not be used in examinations designed to test aptitude for work in liberal arts colleges, but that such tests should probably form a prominent part in the measurement of aptitude for work in technical schools. Looked at from the point of view of the lay reader, perhaps the most interesting single fact revealed in the report is that the girl students exceeded the boys by 17.26 points. The mean based on 4,354 boys was 490.86; the mean for the girls was 508.14. The standard deviations of the means were 1.56 and 1.74 respectively. For the specialist in college admissions the most interesting fact will probably be that the Scholastic Aptitude Test is quite successful in identifying those students who have small chances of success in college.

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## PERSONALITY AND CHARACTER TESTS <sup>1</sup>

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The classifications used in the summary for 1927 will be continued here. During the year 1928 there has been a notable increase in experimentation with existing techniques either for purposes of further standardization or as research tools in new researches. On the other hand, the number of new techniques reported is comparatively small.

A. *Summaries.* In the article just referred to, May, Hartshorne and Welty (124) list 146 titles appearing in 1927. Eight studies of the relation between physique and psychoses are reported by Adler and Mohr (3). Artman and Jacobs (8) include a section on measurement in their review of character education trends. Many of the 539 child psychology titles listed by Baldwin (12) covering the period from 1923 to 1928 deal with research in character and personality. Seven techniques for studying college students together with a few illustrations of each are reviewed by Bickham (21). Cavan (40) gives a comprehensive list of research projects in character education, two thirds of which are theses. One chapter is devoted by Charters (43) to the measurement of traits in which several studies are summarized. Existing techniques for the study of the religious life of children are reported by Chave (47). Recent experimental work on the emotions is summarized by Dashiell (51, 52). Garrett and Kellogg (66) summarize previous studies of physical constitution in relation to intelligence and emotional stability. Gillespie (70) reviews eight techniques in personality analysis and lists 21 titles. Hartshorne and May (75) summarize the literature of measurement in the field of honesty up to 1928. Henderson (79) lists 125 references and describes 42 tests in a study of character measurement. Hendrick (80) lists and discusses 158 studies in personality analysis appearing in the last ten years. Some references to character meas-

<sup>1</sup> This bibliography has been prepared in connection with an Inquiry in Character Education made possible by a grant to Teachers College from the Institute of Social and Religious Research.

urement are found in Hulin (90), and Leary (109) devotes a section of his book to experimental work in the study of personality. Nineteen studies are listed. The work on the Downey will temperament tests is summarized by Uhrbrock (180), who gives a bibliography of 93 titles. Watson (183) describes tests and rating scales available for measuring conduct, knowledge, etc., which might be used in church schools. Wiggam (188) gives a popular interpretation of various methods of personality study. The literature on racial differences appearing during the last four years is reviewed by Yoder (196). Sundry non-intellectual traits are dealt with. The literature on the measurement of personal and social traits accumulated in the past decade is reviewed and helpfully classified by Young (198).

B. *Tests and Techniques Intended Primarily to Measure Objectively (and Mainly in Terms of Conduct) Certain Personality Traits and Types of Behavior.* 1. *Altruism.* Sorokin (163) gave sociology students opportunities to contribute to three causes. Most money went for the least necessary cause, of their own group, and least money to the most necessary cause, of a distant group. Twenty-seven per cent acted in accordance with verbal expression of altruism.

2. *Ascendance-submission.* G. W. Allport (4) reports an elaborate study of ascendance-submission as part of a discussion of the nature of traits. The test is a self-rating scheme involving 35 situations and 123 responses in the form for men. Another form was prepared for women. The device was scored diagnostically by the use of ratings. The resulting correlation with these ratings was .59. A reliability of from .74 to .78 is reported. Using this device, Bender (19) studied the relation of ascendance-submission to height, weight, intelligence, scholarship, introversion-extroversion, sibling position and academic status. Most of these relations appeared negligible but the  $r$  with introversion-extroversion was  $.379 \pm .03$ .

3. *Bluffing.* Thelin and Scott (172) elaborate the faked titles test, originated by Knight, in a series of English tests containing fictitious or coined items. The average bluffing score for 291 students was 44.6 per cent. Fifty-eight non-university persons—bookkeepers, pressmen, salesmen, etc.—had a bluffing score of 25.7 per cent. Students with the highest grades did the least bluffing. The correlation between intelligence and bluffing was zero.

4. *Confidence.* Seward (151) studied the relation of ratings in

confidence to speed of recognition. Correlations from .37 to .81 for individuals are reported.

5. *Coöperation*. Maller (118) reports a study of the effect of a selfish incentive as compared with class loyalty on two types of conduct. In 20 out of 22 classrooms, the average amount of rapid additions done for an individual prize exceeded the average amount done for a class prize. A derived "coöperation" score correlates .20 with intelligence and with age, and about .60 with honesty, persistence and non-suggestibility. The test has a reliability well over .90.

6. *Deception*. Adler and Larson (2) report that the effects on blood pressure, pulse and respiration associated with deliberate lying are not present in delusions and hallucinations. Crosland (50) claims valid results for a word association test of guilt which he used in combination with the usual physiological techniques.

Hartshorne and May (75) describe 22 classroom tests, four athletic contest tests and two party tests of deception, two tests of lying and two tests of stealing. These were administered to large numbers of children in grades three to twelve. Reliabilities ranging from .72 to .87 and validities from .84 to .93 are reported for these techniques. A section of this study (123) reports that siblings resemble each other in deception to about the same degree as in intelligence.

7. *Inhibition*. May (121) discusses performance tests used by the Character Education Inquiry for measuring ability to resist various types of temptation.

8. *Originality*. McClatchy (126) used the Chassell originality tests and the Kent-Rosanoff association test on 19 subjects without definitive results.

9. *Overstatement*. Sixty questions were used with 271 third grade children by Woodrow and Bemmels (190). These gave a reliability coefficient of .71, and correlated .50 with ratings for character, .03 with C.A., .29 with M.A., .39 with school achievement.

10. *Resourcefulness*. Beauchamp and Webb (17) tested 56 high school students in 42 tasks requiring ingenuity, 21 being performed and 21 written out. Results correlated .21 with intelligence and .60 with experience.

C. *Tests and Testing Techniques Intended to Measure Primarily the Affective Aspects of Personality*. I. *Instincts and Emotions*. a. *Laboratory Techniques*. Wechsler and Jones continue their studies of galvanometric technique. In one article (185) they dem-

onstrate the specificity of galvanic reflexes, quoting  $r$ 's averaging .22 for dissimilar stimuli and  $r$ 's averaging .48 for similar stimuli. In another (100) they point out the potency of position in a series of stimuli in determining galvanic deflection, the earlier positions proving more influential. Bayley (16) brings out the difference between the galvanomic effect of a startle and the effect of an apprehension, the former producing sudden deflection with rapid recovery and the latter, more gradual changes. The article includes a bibliography of 140 titles. R. B. Cattell (39) endeavored to trace the causes of galvanic resistance and concludes that it varies with available instinctive energy and conversely with the extent of release of energy taking place in consciousness. Malmud (119) used the galvanometer to measure the sensitivities of individuals to unexpected changes, as removing the top one of a series of steps negotiated blindfolded.

b. *Paper and Pencil Tests.* A few new paper and pencil devices for determining effective reactions have appeared. Saharyanz (150) is reported as using Belsky's method, which employs realistic narratives, pictures, and a book catalog. The subjects' responses to choices are supplemented by conversation during the testing. Israeli (96) secured the opinions of 400 subjects regarding their emotional responses to a set of 20 pictures. Twenty-three adjectives were provided for checking. Agreement in the choice of adjectives was found to increase with age. Town (178) has 80 described situations supposed to elicit such responses as fear, disgust, anger, etc. The subject states how he would feel and act in each situation. Differences in sense of humor were investigated with two subjects by Barry (13), using jokes to be rated in order of humorousness. He finds the essence of humor to be a rapid change in affective tone from unpleasant to neutral or pleasant.

Further work on the Woodworth Personal Data Sheet is reported by Garrett and Schneck (67). The answers to specific questions given by 103 freshmen were studied to discover whether the items had differential diagnostic value. Forty-two items were found which distinguished normals from psychoneurotics when taken as a unit. Neurasthenia could also be differentiated by answers to 16 differential questions. Flemming (59) reports low intercorrelations among the Woodworth Personal Data Sheet, Laird's Personal Inventory and score on the Pressey X-O tests as used with college freshmen. Detailed concomitants of each test are given and the results of



previous studies are briefly indicated. Sixty-nine titles appear in the bibliography.

The Pressey X-O test comes in for further study. Thompson and Remmers (173) secured fresh results from 306 students and compared their results with two other experiments. Large sex differences are noted. Low reliabilities for the separate tests and derived scores are reported. Flügel and Radclyffe (60) compare the results of the X-O test with a questionnaire given to 22 women and 11 men. Reliabilities for separate emotions range from .56 to .91 and the equivalent  $r$ 's for the questionnaire range from .27 to .85. Almost no correspondence between test and questionnaire was found.

II. *Mood and Temperament.* Uhrbrock (180) reports an extensive study of the Downey will-temperament tests, summarizing previous work and supplementing it with a fresh experiment which bears out the conclusions of previous discussions, showing also that the individual and group forms are not comparable. Thompson (174) attempted to validate the will-temperament group test by noting the relation between its several scores and ratings in practice teaching in the case of 74 students in a training school. The correlations range from  $-.19$  to  $+.27$ .

In an extensive study of temperament in relation to other factors, Oates (132) offers data on the reliability and validity of the will-temperament test which is in line with other studies.

Powers (141) studied the practical value of the Marston introversion-extroversion rating scale for measuring these traits in retarded girls. Six judges rated 89 mental defectives on 20 pairs of traits. The results are comparable to Marston's. Evidently the traits involved are largely functions of the situations in which the subjects are rated. Hewlett and Lester (83) attempted to measure extroversion-introversion by evidences of talkativeness recorded in controlled interviews.

III. *Attitudes, Interests, Preferences, Prejudices, etc.* a. *Specific Attitudes.* 1. *Irascibility.* Cason (37) had 659 persons submit common annoyances. Two hundred and thirty-nine of the 21,000 submitted were rated on a 5-point scale by 625 new subjects from which rating an irascibility score was secured. This was correlated with sundry objective facts about the subjects.

2. *Race Attitudes.* Referring to a preliminary discussion (*Psychol. Rev.*, 1927, 34:273-286) Thurstone (175) reports detailed procedures for developing a scale of attitudes toward races and



nationalities. The technique involves paired comparison of all possible combinations of preferences by a large number of judges, and the translation of the preferential proportion into scale values. The position of 21 nationalities on such a scale is given for 239 undergraduates.

3. *Religious Attitudes.* Chave (48) reports a method which he and Thurstone worked out for scaling attitudes toward the church. (See also 176.) The subjects arranged a series of 130 opinions in rank order (sorting them in 11 piles) as expressive of attitudes more or less in favor of the church. The distribution of the scale positions assigned to each opinion determined its final scale position at the point where its ogive passed the 50 per cent level. Opinions were selected for the final scale which were equidistant. Attitudes are measured by adding the scale values of opinions which subjects check as expressing their attitudes. The scale has a reliability of .92 and many other valuable features.

4. *Social Attitudes.* In another article (177) Thurstone describes a technique, comparable to the one just noted, for measuring attitudes toward prohibition. In this case only 13 opinions were used as expressive of a range of attitudes for and against, and these were arranged in a rank order from the one most *anti* to the one most *pro* prohibition. The principle of "just noticeable difference" was used in translating the resulting rank orders into scale values.

Gisp (72) used a free association device to determine attitudes aroused by a variety of stimuli such as "foreigner, Russian, preacher, cigarette," etc. Juniors and seniors in a Missouri high school seemed to have numerous prejudices which the author discusses in connection with motion pictures.

Using a device similar to the social distance technique but requiring the subject to state whether he would accept certain social types as superiors, equals or inferiors in a series of associations of increasing intimacy, Woolston (191) found that with 100 college students conservatism increases with age. The attitudes of various social groups are compared.

b. *Interests and Preferences.* Hogg (84) attempted to determine the capacity of the Strong Interest Report Blank to differentiate groups of women and found it to be as successful with women as with men. Women seem to have less interest in their work than men. Brainard (25) reports an experiment with an interest test which specifies likes and dislikes of a variety of activities related to vocations. Interest was found to be a factor in school success and

indicative of later university activities. Kitson (103) reports an interest scale of ten steps for indicating degree of interest in vocational fields. The highest step is defined as where the S would spend his major time if he had a million dollars and did not have to work. This was applied to 409 teachers. Longer experience is associated with greater interest in teaching. Hendrickson (81) used army alpha, the Kent-Rosanoff free association test, Freyd's occupational interests blank, Hart's social attitudes test and two questionnaires in a study of teachers and prospective teachers, as compared with others. Results are given in detail, showing group contrasts in socioeconomic background, intelligence, introversion-extroversion, leisure time activities and attitudes and interests.

Mechanical interests in relation to mechanical ability, environmental facilities, and age were studied by Hubbard (89), using a modification of Freyd's questionnaire concerning likes and dislikes. Sixty-three items most predictive of mechanical ability were selected. These gave a split form reliability of .87 and a repeat reliability (interval over a year) of .40. Mechanical interests as thus measured show almost no correlation with any of 32 variables, the highest being .35 with mechanical ability. The article has a bibliography of 18 titles. Furfey (62, 63) uses reading interests and play interests, as found from short answer questionnaires, in a study of "developmental age."

c. *Measures of Motivation.* Sims (159) reports the comparative effect of individual and group motivation on improvement in substitution tests and in silent reading. The desire to improve, when accompanied by knowledge of progress, was far superior as an incentive to the desire to help one's team win on both types of material in the case of college sophomores and juniors. The effect of the motives was measured by comparison with the achievement of a control group.

E. *Tests and Techniques Intended to Measure Primarily Social-Ethical Ideas and Judgment.* Brown and Shelmadine (30) report no correspondence between conduct and ethical insight, using a comprehension test of the multiple choice type. By means of a multiple choice questionnaire, Anderson and Dvorak (6) study the standards of conduct of 60 college students and their parents and grandparents. Conduct is apparently determined increasingly by reference to standards of esthetics and prudence as over against a decreasing dependence on ideas of right and wrong. Parents are midway between students and grandparents in these respects. Another study

from the questionnaire administered to 4,000 students of Syracuse University is reported by Katz (101), who summarizes the results regarding future life work, extra-curricular activities, cribbing, academic freedom, etc.

Further work on the George Washington University Social Intelligence Test is reported by Broom (28), T. Hunt (93) and Moss (131) and also by McClatchy (125) and Pintner and Upshall (140). Reliabilities of .85 and .88 are reported and correlations with mechanical aptitudes of .20 and .22; with intelligence .25 to .68; .53 with the Colgate introversion-extroversion score; .14 with a portion of Gilliland's test, which correlates only .12 with intelligence.

A test on the understanding of the Lord's Prayer was given to 540 college students by Wheeler (186). Sixty-five per cent understood it in terms of the interpretation of ten ministers.

Superstitions among 186 college freshmen were investigated by Wagner (181). She reports about 7.6 superstitions apiece as influencing their behavior. Women reported more than men. Superstition scores correlated with intelligence —.12. An aussage suggestibility test correlated .253 with superstition.

*F. Ratings.* A few studies have appeared either justifying new devices or appraising the value of present methods. A typical 5 point scale was used by Armentrout (7) to secure the rating of teachers by training teachers and superintendents. The two groups of judges showed an average of 41 per cent of agreement, which is twice as high as chance would give. Both groups gave few low ratings. The two sets of ratings correlate between .29 and .40.

The value of the Perdue graphic rating scale of teaching qualities was studied by Stalnaker and Remmers (165). Ninety-four students were found to agree closely as to the relative importance of the ten traits involved. An average inter- $r$  of .366 among the traits of one instructor as judged by his student indicates the absence of halo effect.

A rating scale based on a study of 1,000 personnel forms used by 78 colleges is reported by the American Council on Education (5) and a bibliography of some 50 titles is given. Autenrieth (10) gives data for the evaluation of a personality scale emphasizing the need for a measure of the total personality. A pre-school character rating chart is reported by Bridges (27), using 50 pairs of contrasts in social, personal and emotional behavior. Scores correlated with age, and increase with age in correlations between character rating and

Binet point to the presence of a large adjustment factor in the Binet results. Raters agreed to the extent of .78.

The Vineland Behavior Score Card is discussed by Yepson in four articles (192, 193, 194, 195). The device emphasizes objective conduct rather than abstract traits. A reliability of .77 is reported. Scores of contrasted groups from a disciplinary school, a home for boys and an institution for feeble-minded women, showed in each case widely divergent distributions. The card was based on clinical studies of conduct. Correlations of .10 and .15 with M.A. and I.Q. are reported.

G. *Experiments Involving Quantitative Studies.* I. *The Relation of Bodily Structure to Personality Traits.* Adler and Mohr (3) discuss morphological types as extremes of a normal distribution. Kretschmer (105) finds no uniform type of body structure in hysteria. In this Enke (55) agrees but finds the form of hysteria dependent on body structure. He confirms Scholl's findings concerning increased sensitivity to color in cyclothymics and to form in schizophrenics. Gründler (74) reports the athletic and dysplastic types as the most common in epileptics, the pyknic type being quite rare. Galant (65) proposes a new classification of body types for women. J. R. Hunt (92) discusses a new classification of constitutional types called erethitic and kolytic on the basis of excitability and inhibibility.

Reviewing previous studies, Garrett and Kellogg (66) adapt the Naccarati morphologic index to the measurements of standardized photographs of subjects, and correlate the results with the Thorndike college entrance test, the George Washington University social intelligence test and the Woodworth Personal Data Sheet. The  $r$ 's between morphologic index and these three factors are all about zero.  $E$ 's are somewhat larger.

Jaensch (97) describes the biotypes T and B and notes their relation to galvanic and mechanical irritability. The T type corresponds to the introvert and the B type to the extrovert.

Pulse retardation and acceleration in children (Aschner's symptom of autonomic tonus) correlate with condition of reflexes and general behavior according to Lange (107).

The biochemical approach is represented by two articles. Isoagglutinin blood tests of 319 subjects were associated with active and passive temperament by Furukawa (64). About 80 per cent agreement between classifications by blood tests and by ratings is reported.



Rich (145) made acidity of urine and saliva the basis of a study of 57 adults, and secured blood samples from 303 children. Personality was rated by means of the Sheldon scheme (reported in *Personnel J.*, 1927, 6, 47-55). Among many findings it is reported that emotional excitability correlated  $-.25$  to  $-.45$  with acidity. Intelligence and phosphorus excretion per unit of weight correlated  $-.51$ . Quantity of urine was positively associated with good nature, leadership and stolidity. The author concludes that chemical factors are related to inherent mechanisms of character and contribute a measurable maximum ( $r$ 's of  $.20$  to  $.30$ ) to the total make-up of personality.

II. *Behaviors, Traits and Abilities.* 1. *Ability to Report.* Three articles by McGeech (128, 129, 130) bring out that the ability of children from nine to fourteen to make a correct report is specific in relation to the material to be reported. The effect of intelligence on this ability is also a function of the situation. The subjects were 500 to 600 boys and girls. The material consisted of the Binet object card, a picture called the Disputed Case, and an event. Reference is made for details to a previous article (127).

2. *Deception.* Characteristics of cribbers are reported by Brownell (31). They were found to be relatively less intelligent, more extroverted and more psychoneurotic than the campus average.

3. *Occupational Interests.* The application of fourteen indicators of introversion-extroversion by Pechstein (138) to 87 sophomores, 32 first year teachers and 81 experienced teachers revealed a selective process by which the more introverted women get into teaching and stay in it longer. Freyd's occupational interest blank was given by Gaw (68, 69) to a freshman group and again to the same students a year later. The distribution of occupational choices was approximately the same on the two occasions, but individual preferences varied considerably. Beeson and Tope (18) studied the sources of vocational interests of high school students, citing parental influence as the strongest factor, and the feeling of being fitted for the vocation as second in importance. Opportunity for service and social contacts came last. Shannon (153) attempted to determine the personal and social traits requisite for high grade teaching in secondary schools. "Best" and "worst" were rated as possessing or not possessing each of 73 traits by 97 supervisors. The traits most influencing success seem to be sympathy, judgment, self-control, enthusiasm, stimulative power and earnestness. By the use of an undescribed diagnostic temperament test Bathurst (14) found that of 100



subjects, nearly all whose jobs brought them into frequent contact with people possessed distinctive emotional tendencies. Steen and Estabrooks (167) investigated the relation of introversion to vocational choice in the case of 80 college alumni and 263 freshmen, using the Laird test. No relation was discovered.

4. *Reading Interests.* By a questionnaire and by observation, Ross (147) studied the casual reading interests of 209 students and 765 adults. The adults were observed on subways, using 29 news items. These were presented to the students who indicated extent of attention given to each. The least read items in both groups were foreign news, cross words, home and garden, finance, serials, classified advertisements, church, divorce.

5. *Play Interests.* The extensive work on the play quiz is brought together in a volume by Lehman and Witty (113). They report the relation of play to intelligence, sex differences in participation, fortune telling and esthetic appreciation and race differences in interest in boxing in four articles based on the results of this questionnaire (112, 114, 115, 116). Contrasting attitudes towards dogs and cats are reported by Lehman (110) and the comparative influence of chronological age and mental age on play interests is discussed by Lehman and Wilkerson (111). In two articles Chase (44, 45) reports the results of the use of activity blanks by 245 children over a period of five months. Play interests are discussed in (44) and reading interests in (45). Geographical differences in play were discovered. The most popular authors were Burgess, Appleton, Alger and Hope.

6. *Scholastic Success.* Five articles concerned with the concomitants of academic success have appeared. Oates (132) finds no connection between the total Downey will-temperament score and intelligence but a significant correlation between it and scholastic achievement. The four most significant traits are coordination and inhibition in which the successful group is superior, and self-confidence and finality of judgment in which the failure group is superior. Flemming (59) found that honor students were more stable than others, using the Woodworth-Mathews Personal Data Sheet, the Pressey X-O and the Laird Personal Inventory Schedule. With an extensive questionnaire Symonds (169) found that evidences of studiousness among high school boys correlated .62 with teachers' ratings of studiousness, .52 with school marks, and -.37 with mental ability. Revision of the device showed a reliability of about .83, but the revised test correlated .23 with teachers' ratings

and .12 with marks. Particular preferences of studious boys are stated. The author believes that verbal responses can be found which will correlate with almost any conduct trend.

The relation between grades and personality traits is reported by Adams, Furniss and DeBow (1) in the case of 96 college students. Rankings by fellow students in 63 characteristics were obtained, 20 rankings for each subject being gathered twice. These two rankings gave an average  $r$  of .85. School grades from one year to the next correlated .66. The rankings in the 63 traits were correlated with grades and intelligence and the results compared with Webb's. (*Brit. J. Psychol., Mono. Supp.*, 1915, 1, 1-99.) Close agreement with Webb is reported. The average  $r$  of traits and grades is .65 and for traits and test scores .25. Traits classified as dependability and volitional power show a high correlation with grades but relatively low correlation with intelligence tests. The same is true of mentality. The authors conclude that mental tests cannot replace scholastic records as a basis for predicting academic success and when used alone as a basis for entrance to college may operate to select the clever and quick student who is also slack and slothful.

Shuttleworth (156) reports an investigation of character and environmental factors involved in scholastic success, using his University of Iowa Assayer, a self-rating device, a short answer questionnaire, and the high school scholastic record. School record and home background prove to be the most significant predictive factors, particularly when associated with such personality traits as interest in intellectual and cultural things. Failing students are relatively unimaginative, conventional and easy going. A bibliography of 42 titles is appended.

Remmers (144) found no relation between student attitudes toward instructors as measured anonymously by the Perdue graphic scale and the marks given the students by the instructors.

7. *Sociability.* By means of several questionnaires and a multiple choice test of the comprehension type Hsia (88) arrived at several indicators of "sociability" which correlated somewhat with socioeconomic status, intelligence, reading ability and reputation. The test is printed in full and a bibliography of 111 titles is appended.

8. *Social Attitudes.* Participation in student activities was used by Binnewies (22) as an indicator of community spirit. Fraternity members have a higher index of community spirit than non-members. Fowler (61) uses the Hill civic attitudes test to find the relation between civic knowledge and conduct. The students made a code and

rated themselves and were rated by teachers on their observance of the code. Sex differences in racial attitudes are noted by Bogardus (24). These seem to be highly specific. Conversations with 428 people in France and 315 in England are reported by Lapierre (108) as indicating less prejudice against negroes in the former country.

9. *Social Facilitation.* Farnsworth (56) found no consistent difference between intelligence test performance alone and in the classroom.

10. *Social Perception.* Sherman (155) continues to report on the efforts of observers to distinguish among emotional expressions. A screened singer expressed 4 emotions by the repetition of the syllable "ah" on the tone "e." Thirty students reported as many as 18 emotions. Landis and Phelps (106) found that undergraduates could not predict vocational aptitude and success from photographs, using for the experiment the college photos of 20 successful and 20 unsuccessful alumni 25 years out.

11. *Speed.* Reference should be made to Uhrbrock (180) already noted. Braun (26) reports a fairly constant personal "tempo" in five out of seven activities such as tapping, walking, reading, and concludes that a medium tempo is conducive to optimum quality.

12. *Stealing.* Riddle (146) continues his report on stealing as aggressive behavior. Some 343 children were involved. Case histories show that those who steal differ from those who do not in having a greater evidence of leadership and affectionate symptoms. In other personality characteristics the two groups are about alike. The stealers tend also to fighting, quarreling, and the like, while non-stealers are more conventional.

13. *Suggestibility.* Using the Binet lines and three original tests, P. C. Young (199) compared 330 white children with 308 negroes. The latter proved to about one and one-half more suggestible than the former. This difference was paralleled by comparable differences in intelligence. Fernberger (58) reports the use of the Piderit model in an experiment to show the effect of suggestion on the choice of names for the expressed emotions. False suggestions by the examiner were more effective than true suggestions in influencing the judgments of subjects. The total setting or situation seems more important than the facial expression alone in the naming of an emotion.

III. *Moral Concepts and Ideals.* Huxtable (95) develops a plan for character education on the basis of test results with 103 junior high school pupils. Raubenheimer's battery was used and the pupils classified by the results and also by the teachers. The two groupings correlated .60. A scheme of character education is presented. Tuttle (179) reports an experiment with 150 sixth grade children taught with four types of material. Changes in deceptive behavior are reported as occurring more frequently when ethical instruction was given than when it was omitted. Taylor and Powers (171) gave the Laycock test of Biblical information to 98 children who were rated for general character by their teachers. Among those with whom Bible study was voluntary the  $r$  between character and Bible knowledge was .496 and between intelligence and Bible knowledge .415. Among those of whom Bible study was required, the two  $r$ 's were  $-.325$  and  $+.671$  respectively. Sunday-school attendance in the first group correlated .478 with character and .499 with Bible knowledge. A multiple  $r$  of .61 indicates the extent to which character (as rated) can be predicted from intelligence, Bible knowledge and Sunday-school attendance (69 cases). Brotemarkle (29) gives the principles underlying his student personnel record which includes a section on temperament and emotional response. A complete questionnaire is quoted. Palluch (135) used the Fernald method of ranking asocial and altruistic actions as a lesson in literature. Results correlated .60 with intelligence. Shaffer (152) adapted Meltzer's technique for securing social concepts of children to group situations, devising a free expression test. The results correlated from .50 to .67 with the individual test, .54 and .56 with two objective short answer tests and .23 with intelligence.

IV. *Miscellaneous.* Two articles on the effect of sibling position have appeared. Busemann (33) emphasizes the superior educative value of the family of average size and gives evidence for the effects of sibling status on school ability and character. Fenton (57) shows that the only child and youngest child are not as neurotically handicapped as is sometimes claimed.

Three studies discuss the influence of various factors on scholastic experience. Young and Shoemaker (197), using the Colgate Rating Scale, found that selection of majors is as closely related to introversion-extroversion as to intelligence. Steen and Estabrooks (166), on the contrary, found no relation between introversion-extroversion, as measured by the same test, and scholastic interests as measured by



Strong's Vocational Interest Blank. Chambers (41) reports a correlation of .46 between a score based on Pressey's X-O test and college grades and found also important sex and age differences on the X-O.

Various forms of abnormality are reported in five studies. Olson (133) used the Woodworth Personal Data Sheet and the Pressey X-O tests as part of a battery for studying relations of neurotic tendencies to family history, fatigue, nutritional status, etc. Rubasheva (149) found that normal children have wider and more active interests than defectives. Fifty cases of psychopathic personality are studied by Partridge (136, 137), who reports as typical reaction patterns, tantrums, sulks, and running away. Chassell (46) uses statistical methods to trace associations between environmental and experience factors and the characteristics and problems of 270 students. An extensive questionnaire was used which is quoted in full. House (86) reports that, as judged from recollections of childhood, neurotic symptoms among normals exceed those among psychoneurotics in childhood but are fewer than those of psychoneurotics in adulthood. In a significant report Wickman (187) traces various forms of misbehavior in school children to the attitudes of teachers toward such behavior and toward the children.

Castellano (38) reports a positive correlation between intelligence and favorable character and conduct traits.

Hunter and Brunner (94), using the Colgate Personal Inventories, found a bimodal distribution of psychoneurotic and introversion-extroversion symptoms among student gamblers. Applying the criterion for a common factor to a table of intercorrelations of Seashore's eleven traits required for the conduct of research, Smith (161) reports belief in a general factor in research ability. Weber (184) compares the judgments of students regarding primary and secondary emotions with McDougall's list and concludes that the original list is independent of peculiarities of association, emotion and temperament.

Baumgarten and Prescott (15) investigated the attitudes of children of Poland toward the enemy during occupation. Betts (20) reports on the religious attitudes and activities of university students. Hooker (85) reports sundry facts about 1,370 acknowledged leaders in 140 United States villages. Most leaders are between thirty-four and sixty-five, natives of their communities, employed, and church members. Howland (87) studied submerged desires by having medical students and nurses state what they would do with \$200,000.



Kent (102) found that the significance attached by teachers to character traits as objectives of teaching decreased as one ascended the educational ladder from elementary school to college. Kornhauser (104) found that a college course in economics resulted in a shift of opinion slightly in the direction of liberality. Sorokin and Zimmerman *et al.* (164) report sundry social and biological facts about 2,171 leading farmers.

Sims' (157, 158) development of the Chapman-Sims score sheet for measuring socio-economic status has been published together with a supporting monograph. Another revision of this same scale is reported by Heilman (77), basing results on 828 children of Denver, and a scale for rating social environment is offered by Chapin (42). Burdick (32) reports the development of a group test which measures the reactions of children to cultural environment. The Burdick and Sims devices offer complementary approaches to the important problem of how to measure environmental facts and influences.

Unpublished M.A. theses concerned with the study of honesty have been written by Campbell (34), Tatum (170), Atkins (9) and Smith (162). Others relevant to this bibliography are Hathaway (76) on a new apparatus for the psychogalvanic response, and Ross (148) in relation to tests of moral judgment.

Unconsulted Ph.D. theses of importance are Raines (143) on effects of literature on an audience, Heimlein (78) on the effects of major and minor modes in music.

H. *Observation and Record Keeping.* Blanton and Blanton (23) describe techniques for making and recording observations and data and give the results of extensive studies in a valuable guide book. Carmichael (35, 36) reports an extensive use of observations of parents and others on 326 six-year-old children. One thousand two hundred and fifty-six reports contained 3,065 responses dealt with in (35). In (36) the 289 responses classified as misrepresentations of fact are analyzed. Coirault and Nouca (49) report observations on 88 feeble-minded girls to detect constitutional types. Doroshenko (53) reports observations on 114 children's organizations in two Kiev kindergartens. Children of professionals and officials played more complex games which lasted about twice as long as those of proletarian children. Goodenough (73) had 16 graduate students observe by pairs such activities as laughter, talkativeness, leadership, anger, on the part of nursery school children, each pair noting one type of activity. The observations were recorded in 10-second

intervals. This is a development of the observational technique used by Olsen and Parten at the University of Minnesota Institute of Child Welfare. C. L. Ross' study of reading interests (147) previously noted includes the observation of the actual reading done by 765 passengers on the New York subways. The adults favored sports, cartoons, photos, personal violence, disasters.

I. *Discussion Articles.* Bain (11) defends the use of conduct in controlled situations as the best index of attitude. Dashiell (51, 52) discusses emotions and various techniques for identifying them. Edwards, Artman and Fisher (54) report evidences of student morale. Gilliland (71) favors the theory of unified traits as over against the theory of specificity, and notes difficulties in the way of measuring them. Henning (82) describes a technique for using the partner relation in character testing. Hull (91) discusses indices of character and personality (Chapter IV) and the place of interest in behavior (Chapter VI). Mackaye (117) gives evidence on the relation of emotion and attitude to performance in intelligence testing and school work. May (122) summarizes the results of the movement for measuring character. Osipova (134) surveys the work of the reflexological laboratory in Leningrad. Pesker (139) discusses problems in the study of constitutional types. Prinzhorn (142) discusses Klages and Freud and reviews the work of German psychologists interested in personality. Sherman (154) interprets his previous experiments upon the emotional responses of infants, noting the significance of the intensity (quantity) of the stimulus in contrast with its quality. He attributes all emotional differences to the conditioning of the processes of rejection and acceptance to suit specific conditions. Sister Mary (120) reviews Hartshorne and May's monograph on "Testing the Knowledge of Right and Wrong." Slaght (160) discusses character studies of interest to religious educators and mentions problems for research. Symonds (168) contributes to the doctrine of specificity and attacks current concepts of attitude. Thurstone (176) elaborates his technique for measuring attitudes, already noted in this article. Watson (182) discusses areas needing research. Woodrow (189) answers sundry criticisms of character testing.

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## EDUCATIONAL PSYCHOLOGY

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The accompanying bibliography on educational psychology from April, 1928, to April, 1929, includes references of interest to the educational psychologist, exclusive of intelligence tests, educational tests and tests of personality or character.

1. *General Texts.* Notable additions to the texts surveying pretty much the whole field of educational psychology are Jordan (112) and Sandiford (165). Texts covering more limited fields are those of Ellis (59) on individual differences and the revised edition of Pyle (155) on the psychology of learning. Knight and Ruch (117) and Muse (137) provide syllabi and study outlines. Recent advances are reviewed in his presidential address by Gates (75).

Systematic presentations of special interest to educational psychologists are the volumes by Hull (102) on aptitude testing, by Averill (5) on the hygiene of instruction, by Hollingworth (96) on adolescence, by Symonds (183) on the nature of conduct, by Crawford (50) and Stillman (181) on methods of study, by Pillsbury and Meader (152) on language, and by Thorndike, Bregman, Tilton and Woodyard (189) on adult learning.

2. *General Psychology of Learning.* The formulation of the laws of learning in terms of the conditioned reflex is critically examined by Humphrey (106). The laws of primacy, frequency, recency, and vividness are studied by Jersild (107). The effects of various conditions on learning are reported in experiments on articulation by Barlow (11), on whole and parts by Brown (27), on retroactive inhibition by Krueger (119), on affective tone and motivation by Chaney and Lauer (44), Sims (172), and Symonds and Chase (185), on rational learning by Garrison (74), on the relation of various memory capacities by Garrett (73), and on continuous work by Poffenberger (153) and Shepard (170).

Noteworthy are the systematic presentations and experimental studies in the psychology of the emotions. The volumes by Troland (195) on motivation, by Bagby (7) on personality and common emotional disorders, by Kupky (121) and Wilson (212) on

the religious development of childhood and adolescence, by Morgan (136) on abnormal psychology, and by Richardson (160) and Pierce (151) on nervous children reflect this interest. Various studies are reported on the controlling of fear responses.

3. *Psychology of School Subjects.* While the studies in this wide field cover as usual a great range, noteworthy for the year are the studies of vocabulary, detailed studies of errors in various subjects, retention of knowledge and skills, and the relatively large number of controlled experiments.

Vocabulary studies are represented by Baker (8) for French, Shambaugh and Shambaugh (168) for the grades, Shambaugh (169) for ancient history, Remmers and Grant (159) for mathematics, and Stephenson for civics (176).

Error studies and studies of difficulties encountered in spelling are reported by Book and Harter (16), in mathematics by Brueckner (29, 30), Cort (49), Georges (77), Washburne and Vogel (200), Washburne and Morphett (201), in chemistry by Stewart (180), and in reading by Wiley (211).

The retention of acquired knowledges and skills are studied for Latin words and phrases by Anderson and Jordan (3), for history by Bassett (12) and Brooks and Bassett (24), for algebra by Worcester (215) and for poetry by Whiteley and McGeoch (208). The effect of the summer vacation and the recovery of forgotten knowledge and skill have been studied by Bruene (31), by Nelson (141, 142), and by Irmina (104).

The perennial transfer problem is critically examined by Orata (144).

Controlled experiments in schools are reported by Ballow (10) in high school zoology teaching, by Burks and Stone (37) in silent reading, by Douglass and others (56), and Douglass (56) in college teaching, by Duel (67) in laboratory physics, by Funk (71), by Gray (85) in reading, and by Johnson (110) in high school biology.

The Modern Foreign Language Study is reflected in studies by Buchanan and MacPhee (33), by Werner (205), by Young and Dean (216), and by Henmon (90).

Buswell (38) and Gray (86) continue their valuable summaries of arithmetic and reading investigations.

4. *The Preschool Child and Exceptional Children.* The interest in this field increases steadily. Notable treatises are those by Gesell (78) on infancy and human growth, by Watson (203) on the



psychological care of infant and child, by Goddard (79) on gifted children, and by Johnson (109) on the nursery school. A systematic discussion of infancy and early childhood is given by Arlitt (6).

Reports from the several recently established infant welfare stations have appeared, notably the monograph by Bott, Blatz and others (18) on habit formation in young children, the study of sleep of young children by Foster, Goodenough and Anderson (69), the monograph on child care and training by the Minnesota Institute of Child Welfare (105), the studies at Iowa of Carmichael (40, 41) and Baldwin (9), the experimental studies by Pyle and Murphy (156) and the monographs of Alpert (2) and Andrus (4).

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